

## ABSTRACT OF THE DISCLOSURE

A space-time block decoder for a wireless communications system includes a demodulator that generates a demodulated symbol sequence by derotating a signal constellation of a received symbol sequence. A dimension demultiplexer communicates with the demodulator and generates in-phase and quadrature components of the demodulated symbol sequence. A branch metric computation module communicates with the dimension demultiplexer and generates branch metrics based on the in-phase and quadrature components. A Viterbi decoder communicates with the branch metric computation module and generates a user data sequence based on the branch metrics. The in-phase and quadrature components comprise Gray coded data that is bit-interleaved. The branch metric computation module implements bit-by-bit piecewise linear approximation to generate the branch metrics. A deinterleaver that communicates with the branch metric computation module generates deinterleaved metrics based on the branch metrics.